

1.) A survey of 300 union members in New York State reveals that 112 favor the Republican candidate for governor. Construct the 98% confidence interval for the true population proportion of all New York State union members who favor the Republican candidate.

$$p = \frac{112}{300} = .37 \quad \hat{q} = .63 \quad z = 2.33$$

$$E = 2.33 \sqrt{\frac{(.37)(.63)}{300}} = .065$$

$$0.305 < p < 0.435$$

I am 98% confident that the interval from 0.305 to 0.435 contains the true population proportion.

Based on the interval from this sample, who would you predict will win the election?

No - ^{interval is} too low \rightarrow Democrat
 \downarrow below 50%

A question from the past: Does this sample, and thus the interval, represent all voters?

Only works for union opinion not all people.

What are two ways in which this interval would become more narrow?

larger sample size
 smaller confidence level

Let's say that you decide that your sample was not large enough. How many people would you have to survey so that you are 95% confident you have found the true population proportion with only 4% error?

$$n = \frac{(1.96)^2 \cdot (.63)(.37)}{(.04)^2} \approx 560$$

or

$$n = \frac{(1.96)^2 \cdot 0.25}{(.04)^2} \approx 601$$

2.) A football coach randomly selected ten players and timed how long each player took to perform a certain drill. The times (in minutes) were:

7.6 10.4 9.7 8.4 11.8 7.0 6.5 11.1 10.4 12.4

$$n = 10 \quad df = 9 \quad \alpha = 5\%$$

$$\bar{x} = 9.53 \quad t = 2.262$$

$$s = 2.05$$

Determine a 95% confidence interval for the mean time for all players.

$$\bar{x} - E < \mu < \bar{x} + E$$

$$E = 2.262 \cdot \frac{2.05}{\sqrt{10}}$$

$$8.06 < \mu < 11.00$$

$$E = 1.47$$

I am 95% confident that 8.06 to 11 contains the true population mean.